

C L A I M S

1. A tyre for motor-vehicle wheels (1) comprising a toric carcass (2) provided with axially opposite sidewalls and beads for anchoring of said tyre to a corresponding mounting rim, a tread band disposed crown-wise to said carcass and a belt structure (6) interposed between said carcass and tread band, axially extended in a continuous manner between said sidewalls, said tread band being moulded with a raised pattern having at least one circumferential groove (11), characterized in that, in the absence of load and inflating pressure, said belt structure, seen in right section in the plane containing the tyre axis, has

- an axial profile comprising three distinct portions, two side portions referred to as first (14) and second (15) portions, and one central portion (16) respectively, said central portion being interposed between said side portions in register with said circumferential groove (11),
- said side portions being concave at a radially internal position, in which the concavity is defined for each portion by a respective centre and a respective radius of curvature,
- said central portion being concave at a radially external position, in which the depth of said outer concavity is capable of being cancelled under the effect of the normal inflating pressure of the tyre.

2. A tyre as claimed in claim 1, characterized in that the concavity centre of said central portion lies in the centre line plane of said groove (11) which is coincident with the equatorial plane of the tyre.

3. A tyre as claimed in claim 2, characterized in that the depth of said concavity is defined by the following relation:

$$S = R_1 - R_0$$

wherein:

- R_1 corresponds to the radius of a known tyre, substantially identical in its structure and size with said tyre, the belt structure of which, under any condition and seen in axial cross section, exhibits a continuously concave profile in a radially internal position, measured along the equatorial plane of the tyre, when the tyre is mounted to the respective rim and inflated to the normal running pressure;
- R_0 corresponds to the radius of the same known tyre, still measured along the equatorial plane of the tyre, under non-working conditions.

4. A tyre as claimed in claim 2, characterized in that the radii of curvature of said concave side portions are substantially identical with each other and have a value included between 120 and 500 mm.

5. A tyre as claimed in claim 2, characterized in that the radius of curvature of said central concave portion is of a value included between 20 and 150 mm.

6. A tyre as claimed in claim 2, characterized in that the thickness of said tread band at the equatorial plane is included between 1 and 3.5 mm.

7. A tyre as claimed in claim 2, characterized in that the ratio of said groove (11) depth to the thickness of the underlying tread band portion is included between 2 and 10.

8. A tyre as claimed in claim 1, characterized in that the width of said groove (11) is included between 10% and 18% of the width of said tread band.

9. A tyre as claimed in claim 1, characterized in that said groove (11) is comprised, at the inside thereof, of reinforcing means for said tread band.

10. A tyre as claimed in claim 9, characterized in that said groove (11) comprises at least one rib (17) extending in cantilevered fashion from the bottom.

11. A tyre as claimed in claim 10, characterized in that said rib (17) is located at the centre line plane of said groove (11) and is circumferentially continuous.

12. A tyre as claimed in claim 11, characterized in that the ratio of said groove depth to the height of said rib is included between 1.75 and 6.5.

13. A tyre as claimed in claim 10, characterized in that the head (17a) of said rib is made of a coloured blend, for aesthetic and/or safety purposes, for signalling beginning of the aquaplaning danger and/or the maximum admissible limit for tread wear.

14. A process for manufacturing a tyre comprising a toric carcass (2) provided with axially opposite sidewalls and beads for anchoring of said tyre to a corresponding mounting rim, a tread band disposed crown-wise to said carcass and a belt structure (6) interposed between said carcass and tread band, axially extending in a continuous manner between said sidewalls, said tread band being moulded with a raised pattern provided with at least one circumferential groove (11), said process comprising the step of disposing the green tyre, in a toric conformation, in a vulcanization mould for achievement of its final moulded configuration by means of a heat treatment and with the use of fluid under pressure, characterized by utilizing a mould forcing said belt structure to take a moulded configuration; the profile of said moulded configuration, seen in cross section in the plane containing the tyre axis, comprises:

- three distinct portions, i.e. two side portions, respectively referred to as first (14) and second (15) portions, and one third portion (16), the central one, interposed between said side portions in register with said circumferential groove (11),

- said side portions being concave in a radially internal position, in which the concavity is defined for each portion by a respective centre and a respective radius of curvature,

- said central portion being concave in a radially external position, the depth of said radially external portion being capable of being cancelled under the effect of the normal inflating pressure of the tyre.

15. A mould for tyre vulcanization comprising axially opposite sidewalls and a tread band moulded with a raised pattern formed with at least one circumferential groove (11), said mould comprising a pair of axially opposite cheeks corresponding to the sidewalls of said tyre and a matrix interposed between said cheeks, corresponding to said tread band, said matrix being provided with a plurality of ribs projecting in a raised configuration from a bottom surface for forming said pattern, characterized in that, in a plane containing the mould axis,

- the sectional profile of said bottom surface comprises two distinct concave side portions, in which the concavity is defined for each portion by a respective centre and a respective radius of curvature,

- the sectional profile of the surface tangent to the ridge of said ribs in the area included between said side portions has a convexity directed radially inwardly.